Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
International Bureau Seeks Comment on	)	IB Docket No. 16-185
Recommendations Approved by World	)	WAC/053
Radiocommunication Conference Advisory Committee	)	

COMMENTS OF THE BOEING COMPANY; ECHOSTAR SATELLITE OPERATING CORPORATION; HUGHES NETWORK SYSTEMS, LLC; INMARSAT; INTELSAT CORPORATION; JANSKY-BARMAT TELECOMMUNICATIONS INC; LOCKHEED MARTIN CORPORATION; SES AMERICOM INC; SPACE EXPLORATION TECHNOLOGIES CORP. (SPACEX); THALES AVIONICS, INC. AND WORLDVU SATELLITES LTD D/B/A/ ONEWEB

The above-named parties ("the Satellite Companies") submit these comments in response to the Public Notice issued by the Commission seeking comment on the draft recommendations prepared by its World Radiocommunication Conference 2019 ("WRC-19") Advisory Committee ("WAC").[1] Although the WAC recommendations address a number of items under review for WRC-19, these comments focus on Document WAC/053 (23.04.18) ("WAC/053"), which addresses Agenda Item 1.13: "to consider identification of frequency bands for the future development of International Mobile Telecommunications (IMT), including possible additional allocations to the mobile service on a primary basis, in accordance with Resolution 238 (WRC-15)". Specifically the Satellite Companies urge the Commission to recommend to the State Department that View B to WAC/053 should be adopted as the U.S. position for Agenda Item 1.13 with regard to the 37-43.5 GHz band. This proposal appropriately

[1] Public Notice, International Bureau Seeks Comment on Recommendations Approved by World Radiocommunication Conference Advisory Committee, IB Docket No. 16-185 (April 26, 2018) ("Public Notice").

focuses on the needs of Region 2, is consistent with the Commission's Spectrum Frontiers Order and U.S. spectrum allocations, is faithful to the language and intent of Resolution 238 to ensure protection of incumbent services, and provides an appropriate balance for the use of the band by terrestrial mobile and incumbent satellite operations in the band.

I. BACKGROUND

The Commission, as part of the U.S. WRC preparation process, is currently developing positions on a variety of International Telecommunication Union ("ITU") WRC-19 Agenda Items for submission to the regional WRC preparatory process organized through the Inter-American Telecommunication Commission ("CITEL"). Through CITEL, Region 2 member states will provide feedback on individual member proposals with the intent of developing consensus regional proposals for submission to WRC-19. It is therefore timely for the United States to submit a draft proposal to CITEL addressing a portion of the bands considered under Agenda Item 1.13. The Satellite Companies urge the FCC to support the proposal contained in View B of WAC/053.

The WAC received competing proposals addressing identification of spectrum for IMT within the frequency range 37-43.5 GHz.[2] View A represents the views of several mobile terrestrial industry participants.[3] View B represents the views of a number of members of the WAC, including several of the Satellite Companies, and proposes that WRC-19:

(i) adopt a footnote to the International Table of Allocations ("Table of Allocations") identifying the frequency ranges 37-40 GHz and 42.5-43.5 GHz for IMT in ITU Region 2;

(ii) adopt a second footnote in the Table of Allocations upgrading the mobile service from a secondary allocation to a co-primary allocation in the frequency range 42-42.5 GHz in

[2] *Id*., Attachment A at 10.
[3] *Id.* at 12-18.

ITU Region 2, identify the band for IMT and restrict the upgraded primary mobile service allocation to IMT; and

(iii) adopt a Resolution providing for the implementation of IMT and protection of incumbent satellite services in all of the above bands.

This proposal strikes the right balance between the needs of terrestrial 5G and satellite service providers, is consistent with the ITU mission and the principles of Agenda Item 1.13 and provides for the necessary harmonization while protecting valuable services in Region 2.

II. THE U.S. POSITION SHOULD ONLY FOCUS ON HARMONIZING SPECTRUM IN REGION 2

View A proposes "a global identification for IMT in 37-43.5 GHz [which] would allow each country/region to assign spectrum for 5G consistent with their domestic use and priorities."[4] Under this proposal the United States would propose an IMT identification in the entire frequency range 37-43.5 GHz not only for Region 2 but also for Regions 1 and 3, and each country would decide which specific portions of the frequency range would be used for IMT and how compatibility would be achieved between IMT and other services sharing portions of the same band. Unfortunately, this proposal would provide no protections for incumbent services, such as fixed satellite service ("FSS"), and would likely result in less FSS use of this band, undermining international harmonization of FSS services.

The ITU's Constitutional mission includes working "to harmonize the actions of Member States" and to "effect allocation" of radio spectrum and "coordinate efforts" between members "to avoid harmful interference between radio stations of different countries."[5] Thus, the ITU

[4] *Id*. at 12.
[5] Constitution of the International Telecommunication Union, Collection of the Basic Texts of the International Telecommunication Union Adopted by the Plenipotentiary Conference, 2015, Articles 8,11-12

exists both to help harmonize frequency allocations and also to develop protection measures for use by countries that lack harmonized frequency allocations.

It is incompatible with the ITU's mission and Resolution 238 for the United States to urge the WRC-19 to abandon, as proposed in View A, efforts to identify bands where sharing between IMT and other services is possible and also to define the protection mechanisms for incumbent services, as expressly provided in Resolution 238. Instead, the Satellite Companies urge the United States to take the lead for harmonizing spectrum for IMT and other services in Region 2, building on the Commission's Second Report and Order adopted in the Spectrum Frontiers proceeding and its current spectrum allocations.[6] Such an approach will ensure that both IMT and satellite operations are harmonized on a regional basis and that the most efficient use of spectrum is achieved.

III. VIEW B PROVIDES THE MOST APPROPRIATE BALANCE BETWEEN TERRESTRIAL 5G AND SATELLITE NEEDS IN REGION 2

The communications industry as a whole, including the satellite industry, is aggressively pursuing a future in which 5G services will enable "anytime, anywhere" capabilities to consumers in the United States and throughout the Americas to support a myriad of user devices and applications never imagined. All industry participants agree that 5G will be a network of networks, comprising complementary technologies, including terrestrial mobile, satellite, fixed microwave, and even stratospheric platforms such as high altitude platform stations. Each technology has critical performance benefits ensuring the 5G network of networks meets the needs and demands of all end users – no matter where they are located.

[6] Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, GN Docket No. 14-177, *et al.* (Nov. 22, 2017) ("Spectrum Frontiers Second R&O").

Satellites are an important part of this vision for worldwide, high-speed broadband access in the 5G era, and a vital contributor to U.S. technological competitiveness and job creation. Each 5G technology – including satellites – will require access to sufficient spectrum to deliver the very high capacity and high speed services that consumers and businesses will demand. President Trump's National Space Council recognized the importance of this goal, recommending in its February 2018 report that the National Telecommunications and Information Administration ("NTIA") and the Commission coordinate to ensure the protection and stewardship of the spectrum necessary for commercial space activities.[7]

The Commission's proposal concerning Agenda Item 1.13 and the band 37-43.5 GHz should strike the right balance between the needs of terrestrial 5G and satellite services to ensure that both technologies can adequately serve consumers. The necessity of this balance has been recognized by the Executive Secretary of the National Space Council in recent remarks on U.S. competitiveness and policy in the new space era.[8] The View B proposal achieves such a balance while the View A proposal, which solely focuses on the potential needs of terrestrial 5G to the exclusion of other services, would dramatically increase the cost and complexity of FSS spacecraft, and would result in harmful interference to FSS when next-generation terrestrial and satellite services – both of which will be ubiquitous – are deployed.

[7] *See* https://spacepolicyonline.com/wp-content/uploads/2018/02/WH-press-release-NSpC-Recs-Feb-21-2018.pdf (Recommendation 3). *See also* comments of Earl Comstock, director of the Office of Policy and Strategic Planning at the Commerce Department: "'There is a concern within the administration' about protecting satellite applications even while trying to also facilitate 5G services. . . . 'We don't want to discover that we've stunted the growth of that market by denying them spectrum that might be needed'." "Space Council Seeking to Protect Satellite Spectrum, Space News, May 1, 2018, available at http://spacenews.com/space-council-seeking-to-protect-satellite-spectrum/.

[8] Address of Scott Pace, Executive Secretary, National Space Council, to Hudson Institute, April 30, 2018, *video available at* https://www.hudson.org/events/1553-space-2-0-u-s-competitiveness-and-policy-in-the-new-space-era42018, at 17:01-17:12 ("There is an urgent need to provide reasonable protection for satellite gateway earth stations in certain frequency bands, as well as protection for satellite end user terminals in core satellite bands.").

A. Studies Demonstrate that Sharing Under View B is Feasible

Consistent with the Commission's decision in the Spectrum Frontiers proceeding, View B proposes to identify the 37-40 GHz band for IMT and reserves the 40-42 GHz band for satellite dedicated use. In the United States today, the 40-42 GHz band is reserved for FSS use.[9] In making this reservation, the FCC expressly recognized that ubiquitously deployed UMFUs and FSS user terminals could not share the same band, and no studies have demonstrated to date that such use is compatible with an IMT deployment.[10] It is critical for the United States to adopt this same approach in Region 2. By harmonizing the use of the 40-42 GHz band for FSS user terminals, the United States would be building on footnote 5.516B of the ITU Radio Regulations ensuring this spectrum is available for use by high-density applications in the FSS.[11]

In order to provide flexibility for harmonization of IMT spectrum in Region 2, View B also proposes to identify the band 42-43.5 GHz for IMT as this band can be shared between IMT and individually licensed FSS earth stations. This proposal would make available a total of 4.5 GHz of spectrum among which countries in Region 2 can select frequencies for IMT identification based on their needs while preserving 2 GHz of core spectrum for deployment of FSS user terminals. Similar to IMT equipment today, future IMT equipment is expected to have the technical capability to adjust to different frequency ranges. This technical capability and the access to up to 4.5 GHz of spectrum in Region 2 will ensure that the benefits of economies of scale for terrestrial IMT are achieved in Region 2 and worldwide.

[9] Spectrum Frontiers Second R&O at ¶ 192.
[10] To the contrary, studies contributed to ITU-R indicate that an FSS earth station requires distances up to a kilometer from an IMT base station to avoid harmful interference. *See* Documents 5-1/313 and 5-1/364, *available at* https://www.itu.int/md/R15-TG5.1-C-0317/en and https://www.itu.int/md/R15-TG5.1-C-0317/en.
[11] Radio Regulations, Edition of 2016.

B. View B Provides IMT Operators Flexibility while Protecting Valuable Satellite Services

Unlike View A, which focuses exclusively on the needs of terrestrial IMT and negates the requirements in Resolution 238 that incumbent services be protected, View B proposes the introduction of a WRC Resolution providing for the implementation of IMT and protection of satellite services. This Resolution captures the key assumptions and conclusions of sharing studies conducted by ITU-R Task Group 5/1, which demonstrated that IMT and satellite services are compatible in certain frequency ranges under the studied conditions.[12] Although the Satellite Companies recognize the value in identifying additional spectrum for future IMT service, satellite services require technical protections and harmonized spectrum on a regional basis through the Radio Regulations. Satellite signals do not stop at borders and it is simply not technically feasible to design satellites, serving ubiquitously-deployed terminals, to comply with frequency allocations and interference environments defined on a country-by-country basis, as proposed by View A.

The proposed Resolution recognizes that geographic separations between FSS earth stations and IMT deployments should be adopted in order to ensure compatibility, as demonstrated by the ITU-R studies and as recognized in the Spectrum Frontiers Second R&O.[13] It leaves full flexibility to administrations regarding implementation of such geographic separation requirements.

The Resolution also captures two key assumptions used in ITU-R studies, the minimum downtilt and maximum e.i.r.p. of base stations provided by the expert IMT group, ITU-R WP 5D. The Satellite Companies recognize that these assumptions may not be aligned with U.S.

[12] *See, e.g.*, Annexes 5 (Part 1) and 6 to Document 5-1/287, *available at* https://www.itu.int/md/R15-TG5.1-C-0287/en.
[13] *See* Spectrum Frontiers Second R&O at ¶ 136.

national decisions providing flexibility in the design of IMT systems and that there may be other ways to ensure that IMT deployment remains compatible with satellite services as IMT technology evolves. For example, a radiated power mask for positive elevation angles could be developed based on the assumptions and margins of ITU-R studies. Such a mask would not constrain the performance of IMT networks as it would only apply to the signals radiated outside of the IMT service area and allow for a higher base station power, taking into account the positive margins obtained in ITU-R studies. Alternative solutions could be explored and the United States position could be refined considering proposals submitted by countries to the ITU and to CITEL.

IV. CONCLUSION

The Commission should recommend to the Department of State the Agenda Item 1.13 View B proposal embodied in WAC/053 be adopted as the U.S. position for the 37-43.5 GHz band. This proposal strikes the right balance between the needs of terrestrial 5G and satellite service providers, is consistent with the ITU mission and consistent with the mandates of Agenda Item 1.13 and the accompanying Resolution. It will also lead to spectrum harmonization for IMT and incumbent services in Region 2, and provide the required protections for incumbent services as called for in the language of Resolution 238.

Respectfully submitted,

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